

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO. 09/855,496
ATTORNEY DOCKET NO Q64375

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (*Currently Amended*) A multiplier ~~Multiplier~~ arrangement comprising (MUXER) ~~including~~ a pair of input terminals that receive (inmux1,inmux2) ~~to which~~ analog phase information ~~is provided~~, said multiplier arrangement receiving (MUXER) ~~being further adapted to receive~~ a set of high-frequency local oscillator signals (LO1, LO2, LO3, LO4) ~~which are phase-shifted 90 degrees in phase shifted~~ with respect to each other, said multiplier arrangement generating, (MUXER) ~~being adapted to generate~~ from said analog phase information and from said high-frequency local oscillator signals (LO1, LO2, LO3, LO4), components of a high-frequency phase vector and synthesizing (PV), ~~and to synthesise~~ said high-frequency phase vector (PV) ~~from said components within a summing means (SUM) of said multiplier arrangement, wherein~~

~~characterised in that~~

said multiplier arrangement receives a set of differential high frequency local oscillator signals and provides (MUXER) ~~is further adapted to provide~~ said high-frequency phase vector (PV) ~~as a vector that which~~ is making an excursion alongside the contours of a square within a ~~the~~ complex plane during a first category of predetermined transitions of a phase signal (ϕ) ~~on which~~ said analog phase information is dependent, said multiplier arrangement further comprising:

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a pair of output terminals on which said high-frequency phase vector is output as a differential high-frequency phase vector;

a plurality of multipliers, each multiplier of said plurality having a respective input terminal that is coupled to a first terminal of an associated switch, a second terminal of said associated switch being coupled to one of said pair of input terminals of said multiplier arrangement or to a ground reference terminal under control of a respective control signal; and
a set of control input terminals to which said respective control signals are provided.

2. *(Currently Amended)* The multiplier ~~Multiplier~~ arrangement (MUXER) according to claim 1, wherein

~~characterised in that~~

said multiplier arrangement provides ~~(MUXER) is further adapted to provide~~ said high-frequency phase vector ~~(PV)~~ as a vector that ~~which~~ is making an excursion alongside the diagonals of said square during a second category of predetermined transitions of said phase signal, said second category being ~~(ϕ) which is different from said first category~~ .

3-4. *(Cancelled)*.

5. (*Currently Amended*) The multiplier ~~Multiplier~~-arrangement (~~MUXER~~) according to claim 1[[4]], wherein

~~characterised in that~~

said multipliers (~~M1,M2,M3,M4~~) of said plurality of multipliers ~~are adapted to deliver~~ respective ones of said components of said high-frequency phase vector (~~PV~~).

6. (*Currently Amended*) The multiplier ~~Multiplier~~-arrangement (~~MUXER~~) according to claim 1[[4]], wherein

~~characterised in that~~

a multiplier (~~M1~~) of said plurality of multipliers comprises ~~includes~~ a differential pair of transistors (~~T11,T12~~),

[[-]] wherein respective control terminals of said transistors ~~are adapted to receive~~ respective components of a differential high-frequency local oscillator signal of said set of differential high-frequency local oscillator signals,

[[-]] respective first conductive terminals of said transistors of said differential pair are coupled to the output terminal of a transconductor circuit (~~TC~~) of which an input terminal is coupled to said respective input terminal (~~inn1~~) of said multiplier (~~M1~~), and

[[-]] respective second conductive terminals of said transistors of said differential pair being coupled to input terminals of said summing means (~~SUM~~).

7. (*Currently Amended*) ~~The multiplier~~ Multiplier arrangement (MUXER) according to claim 6, wherein

~~characterised in that~~

said transconductor circuit comprises ~~(TC)~~ includes a transistor ~~(T13)~~, a control terminal of which is coupled to said input terminal of said transconductor circuit, a first conductive terminal of which is coupled to the ground reference terminal via an impedance device ~~(R1)~~, and a second conductive terminal of which is coupled to said output terminal of said transconductor circuit.

8. (*Currently Amended*) A signal ~~Signal-modulator that generates (SM) adapted to~~ generate a high-frequency output signal from analog phase information, said signal modulator comprising: including

[[-]] a pair of input terminals that receive ~~(SM1, SM2) to which~~ said analog phase information ~~is provided,~~

[[-]] a quadrature generator that generates ~~(QG) adapted to generate~~ a set of high-frequency local oscillator signals ~~(LO1, LO2, LO3, LO4)~~, which are phase-shifted 90 degrees ~~in~~ phase shifted with respect to each other,

[[-]] a multiplier arrangement according to claim 1 that receives ~~(MUXER) adapted to~~ receive said analog phase information and said set of high-frequency local oscillator signals and generates therefrom ~~to generate from it~~ a high-frequency phase vector, wherein ~~(PV)~~,

~~characterised in that~~

~~[[-]]~~ said multiplier arrangement is further adapted in accordance with claim 1

~~[[-]]~~ said signal modulator further comprises ~~includes~~ an envelope limiter that
transforms (EL) ~~adapted to transform~~ said high-frequency phase vector into said high-frequency
output signal.

9. *(Currently Amended)* The signal ~~Signal~~ modulator (SM) according to claim 1 ~~[[4]]~~,
wherein

~~characterised in that~~

said signal modulator further comprises (SM) ~~includes~~ a control circuit that receives (CC)
~~adapted to receive~~ said phase signal (ϕ) and derives ~~to derive~~ therefrom said respective control
signals ~~(e1,e2,e3,e4)~~ for provision to said multiplier arrangement.

10. *(Currently Amended)* The signal modulator ~~Multiplier arrangement~~ (MUXER)
according to claim 9, wherein

~~characterised in that~~

said control circuit generates (CC) ~~is further adapted to generate~~ said respective control
signals so such that at most two of said multipliers of said plurality of multipliers are coupled to
a respective one of said pair of input terminals ~~(inmux1,inmux2)~~ of said multiplier arrangement
(MUXER).

11. (*Currently Amended*) A signal ~~Signal~~-modulator (SM)-according to claim 10, wherein
~~characterised in that~~
said envelope limiter comprises a (~~EL~~) ~~includes another~~ differential pair of transistors
(~~Te1,Te2~~),
[[-]] respective control terminals of which are coupled to said pair of output terminals
(~~outmux1,outmux2~~) of said multiplier arrangement (~~MUXER~~),
[[-]] respective first conductive terminals of which are coupled to the output terminal
of a bias circuit (~~BC~~), and
[[-]] respective second conductive terminals of which are coupled to a pair of
differential output terminals (~~outel1,outel2~~) of said envelope limiter (~~EL~~) and being coupled to a
~~the~~ supply voltage terminal (~~Vee~~) via respective impedance devices (~~R7,R8~~).

12. (*Currently Amended*) A transmitter comprising: ~~Transmitter (TX) including~~
[[-]] a transmit data source that delivers ~~adapted to deliver~~ transmit data; ~~to~~
[[-]] a phase accumulator that determines a phase signal (~~PAC~~) of said transmitter
(~~TX~~), ~~said phase accumulator (PAC) being adapted to determine from said transmit data; a phase~~
~~signal (ϕ) for delivery to~~
[[-]] an analog pulse shaper that generates analog phase information (~~BAP~~) of said
transmitter (~~TX~~), ~~said analog pulse shaper being adapted to generate from said phase signal (ϕ),~~
wherein said analog phase information is generated as two balanced analog signals; analog phase
~~information for delivery to~~

[[-]] a signal modulator according to claim 8 that generates (SM) of said transmitter ~~being adapted to generate~~ a high-frequency output signal from said analog phase information; and for delivery to

[[-]] a power amplifier that amplifies (PA) of said transmitter ~~being adapted to amplify~~ said high-frequency output signal for further transmission to a receiver;

~~characterised in that~~

[[-]] ~~said analog pulse shaper is further adapted to generate said analog phase information as two balanced analog signals (B,B);~~

[[-]] ~~said signal modulator is further adapted in accordance with claim 9.~~

13. *(Currently Amended)* A transmitter ~~Transmitter~~ according to claim 12, wherein

~~characterised in that~~

said analog pulse shaper comprises (BAP) ~~includes~~ a read-only memory device ~~(ROM)~~ coupled to a digital-analog converter ~~(DAC)~~.

14. *(New)* A multiplier arrangement comprising:

a plurality of multipliers that receives at least two analog phase information signals and a set of differential high-frequency local oscillator signals that are phase-shifted 90 degrees with respect to each other, wherein each multiplier comprises an input switch that is coupled to one of said analog phase information signals or to a ground reference terminal under control of a respective control signal, said multiplier arrangement generating, from said analog phase

information and from said high-frequency local oscillator signals, components of a high-frequency phase vector; and

a summing circuit that synthesizes said high-frequency phase vector from said components, wherein said high-frequency phase vector is a vector that is making an excursion alongside the contours of a square within a complex plane during a first category of predetermined transitions of a phase signal on which said analog phase information is dependent.

15. *(New)* The multiplier arrangement according to claim 14, wherein said multiplier arrangement provides said high-frequency phase vector as a vector that is making an excursion alongside the diagonals of said square during a second category of predetermined transitions of said phase signal, said second category being different from said first category.

16. *(New)* A signal modulator that generates a high-frequency output signal, said signal modulator comprising:

a quadrature generator that generates a set of high-frequency local oscillator signals, which are phase-shifted 90 degrees with respect to each other;

a multiplier arrangement according to claim 14 that receives said analog phase information signals and said set of high-frequency local oscillator signals and generates therefrom a high-frequency phase vector; and

an envelope limiter that transforms said high-frequency phase vector into said high-frequency output signal.

17. (*New*) The signal modulator according to claim 16, wherein said signal modulator further comprises a control circuit that receives said phase signal information signals and derives therefrom said respective control signals for said multipliers.

18. (*New*) The signal modulator according to claim 17, wherein said control circuit generates said respective control signals so that at most two of said multipliers of said plurality of multipliers are coupled to one of said phase signal information signals.

19. (*New*) A transmitter comprising:
a transmit data source that delivers transmit data;
a phase accumulator that determines a phase signal from said transmit data;
an analog pulse shaper that generates analog phase information from said phase signal,
wherein said analog phase information is generated as two balanced analog signals;
a signal modulator according to claim 16 that generates a high-frequency output signal from said analog phase information; and
a power amplifier that amplifies said high-frequency output signal for further transmission to a receiver.

20. (*New*) A transmitter according to claim 19, wherein said analog pulse shaper comprises a read-only memory device coupled to a digital-analog converter.